

The nidification of some common Indian birds—Part 1

BY

B. S. LAMBA

Zoological Survey of India, Calcutta

INTRODUCTION

Very little is known about the breeding habits of common Indian birds. Monumental works of savants like Hume (1873, 1889) and Baker (1932) on the subject of nidification deal mainly with the breeding seasons, situation and location of nests, descriptions and measurements of nests and eggs. Many interesting aspects like courtship, nest building, territory, incubation, etc. have been completely left out in the majority of the cases. Although many ornithologists and naturalists have written from time to time about one or more of these aspects of some species or the other, yet our present knowledge of the subject remains sadly deficient.

Material and method. I first got interested in the subject while I was working on the systematics of birds of Hoshiarpur at Panjab University during 1951-52. But the really good opportunity to pursue my interest was provided by the Virus Research Centre, Poona¹, where I worked during 1953-57. In 1953 the Virus Research Centre became interested in nestling birds considering the possibility of their being potential propagators of arthropod-borne viruses. I was asked to keep an eye on the breeding pattern of some of the common species of birds in and around Poona. Accordingly, nests of common species of birds in and around Poona were located by scouting the area. A systematic record was kept of the situation and location of the individual nests. The nests were visited at intervals of one to four days and the contents noted after having a look at the nest. Similar observations were repeated at the Vellore (N. Arcot, Madras) Field Station of the V. R. C., Poona, in 1955-56 and at the Akividu (W. Godavari, Andhra) Field Station in 1956-57 where, in addition to the resident breeding birds, many species of water birds collect in enormous numbers to breed in and around Kolair Lake. On joining the Zoological Survey of India in December

¹ The Virus Research Centre is jointly maintained by the Indian Council of Medical Research and the Rockefeller Foundation.

1957, I was encouraged to keep up my studies, and made observations in and around Calcutta, at Chilka Lake (Puri, Orissa), and in the Balaghat Forest Division (Madhya Pradesh).

Data gathered from these observations and other observational notes kept from time to time are being utilised in the preparation of this series.

Acknowledgements. I am indebted to the Director, Virus Research Centre, Poona, and the Director, Zoological Survey of India, Calcutta, for the facilities extended for carrying out these studies. I express my thanks to Dr. J. Austin Kerr and Dr. Telford H. Work of Virus Research Centre, Poona, Lt.-Col. S. L. Kalra of the Armed Forces Medical College, Poona, Dr. B. Biswas of the Zoological Survey of India, Calcutta, and Dr. Sálím Ali and Mr. Humayun Abdulali of the Bombay Natural History Society for their helpful suggestions. I also thank Prof. G. P. Sharma, Head of the Department of Zoology, Panjab University, Chandigarh, for having initiated my interest in the subject.

1. THE COMMON INDIAN HOUSE CROW, *Corvus splendens* (VIEILLOT), WITH NOTES ON BROOD PARASITISM ON IT BY THE INDIAN KOEL, *Eudynamys scolopacea* (LINN.)¹

Previous work. The Common Indian House Crow needs no introduction. It is by far the commonest bird of India and yet not much is known about its nidification. Hume (1873 : 413-14) was perhaps the first ornithologist to collate the data then available on the subject. But the information was rather sketchy and far from complete. Many interesting aspects like courtship, nest building, territory, incubation, mortality in young and feeding the young, etc. were, however, left completely untouched even in his later (Hume 1889 : 8-12) and more elaborate compilation, presumably because nothing much was then known about them. Dewar (1905) gave a very useful, still more elaborate and original account of the breeding habits of this bird, but he too failed to throw any light on some of these aspects, especially territory, incubation period, and mortality in the young. Many ornithologists and naturalists (Adam, 1873 ; Butler, 1875 ; Davidson, 1878 ; Cripps, 1878 ; Scully, 1879 ; Doig, 1879 ; Vidal, 1880 ; Ried, 1881 ; Swinhoe, 1885 ; Barnes, 1886 ; Davidson, 1887 ; Taylor, 1887 ; Oates, 1889a ; Munn, 1894 ; Jesse, 1902 ; Fergusson, 1903 ; Prater, 1926 ; Ali, 1926, 1946, 1953 ; Ali & Abdulali, 1937 ; Baker, 1926, 1932 ; Whistler, 1928 ; Inglis, 1931-34 ; Rao, 1936 ; Sen, 1947 to cite a few) have written about the nidification of this bird from time to time but the subject is still far from exhausted.

¹ This section is based almost entirely on observations made when I was working with the Virus Research Centre, Poona.

Breeding season. The breeding season of the common Indian House Crow, *Corvus splendens* (Vieillot), seems to differ slightly in different parts of India. In this connection Hume as early as 1889 stated that the 'breeding season par excellence is June and July but an occasional nest will be found earlier even in Upper India and in Southern and Eastern India a great number lay in May'. According to Dewar (1919 : 27-28) the breeding season of this species 'in Northern, Western and Central India is June to August, most eggs being laid between June 10th and 30th. In Bengal and Burma from March to May, also in January and December. In South India from April to June, a few birds however, nest in November and December or February and March.' Whistler (1928 : 8) remarked that the 'breeding season is very regular in the North-west, eggs being laid from the middle of June till the middle of July. In the rest of India numbers lay in April and May and occasionally nests are found in November, December and January.' Baker (1932 : 16) writing on the subject stated : 'Over Eastern Bengal, Bihar and Arakan the normal breeding season is March and April but in Dacca and Mymensingh there are two well-defined seasons : December, January and February in winter and April, May, and rarely June in the hot weather. In Ratnagiri and in other parts of Bombay Presidency Messrs. Vidal and Davidson found that they had two similar seasons, the principal months being November and December and then again in April and May. Over the rest of India the favourite months seem to be June and July.' Ali (1946 : 2) writing on the subject states : 'In Western India, House-Crows nest between April and June, in Bengal slightly earlier ; while in the heavy rainfall areas of SW. India breeding is usually over before the onset of the South-west Monsoon in May.'

Around Poona where a part of this study was made, the breeding season commenced by the end of April, most eggs and nests were found in May-June, and fledglings in June-July. Occasional nests were also met with in August. On the other hand at Vellore (N. Arcot, Madras) where a major portion of the present work was executed the nests did not start coming up till nearly the middle of May. Most of the eggs were found in June and most fledglings in July. The breeding season lingered fairly well into August, when a few nests with fledglings could be located.

Mating. With the advent of the breeding season large flocks, which feed and habitually hang about near markets, rice and ground-nut mills, municipal refuse-dumping grounds and cultivated fields, start breaking up. Partners are now sought out and courted. The pairs keep fairly close together even when feeding. At this time if any one happens to look for crows one can find them sitting in pairs on shady

trees or in other shady spots, resting after their meals, during the hottest part of the day.

Apparently the crow does not like to make a public exhibition of its connubial affections. Whereas it does not mind a little indulgence in public, by way of head-tickling in a tree, on a house top, or any other convenient spot, it is rather discreet about its sexual intercourse. Although the most common bird everywhere, very rarely indeed does one observe crows copulating. Copulation usually takes place in trees, sometimes on house tops or on the ground, and occasionally even in the middle of a busy road (Acharya, 1951). No particular part of the day is preferred, and it is most frequent when the nest is under construction. It may be preceded by mild spooning (head-tickling) or the passage of a toothsome morsel from male to female but, as frequently as not, it comes off without any preliminaries. The male having secured a hold on the female's head with his beak mounts on her back, and she in turn sits quietly with neck drawn in and wings spread out a little. Balancing himself with his foot-and-beak hold the male brings his hind quarters down to effect a cloacal connection. The whole process hardly takes a few seconds. Sometimes, however, the male is not able to establish the connection at the first attempt, either because of losing his balance while lowering his hind part or owing to the movement of the female at the crucial moment under his weight. In such cases the male lowers his hind quarters a number of times against the female cloacal opening.

Nest building. Mating in crows is indicative of the fact that they have either started building nests or are going to do so shortly. The first step towards the construction of the nest is the selection of a suitable site, of which there appears to be no lack for the House Crow. It is not known which sex makes the final decision as regards the suitability of the site, but I have reasons to believe that the female does have an important say in the matter. It is not an uncommon sight in the breeding season to see a bird, stick in beak, moving from one tree to another, hesitant to put it down, being followed closely by another bird with or without a stick. On three such occasions I have shot the leader in order to determine the sex and all the three turned out to be females.

A thin vertical fork near the top of the tree, or on one of the outermost branches of any of the larger trees like *Dalbergia sissoo*, *Acacia arabica*, *Tamarindus indicus*, *Melia azadirachta*, or *Ficus* is a favourite site. But in the localities where large trees are wanting or have already been occupied by others of its own species, it does not hesitate to avail itself of other sites provided by smaller trees, edges and nooks of buildings (Hume, 1889 : 8 ; Baker, 1932 : 17), telephone and telegraph

poles and wires (Dewar, 1905 : 25). It is seldom that a site inside a building is selected ; the most famous and historic of such cases on record is that reported by Benjamin Aitken to A. O. Hume (1889 : 10) of a pair of Madras crows who selected the very narrow top ledge of a pillar in the verandah of an office to construct a nest and took nearly five months to finally build a nest which did not fall off the ledge. The site selected is invariably in or near human habitation.

After the site for the nest has been selected construction starts in right earnest. Both the birds go hunting for twigs/sticks together. Dry, usually thorny, sticks and twigs are picked up from under trees, hedges around the fields and farms, and from the firewood piles of the poorer classes of labourers who collect dry sticks for cooking. If fallen sticks are not easily available, green twigs are wrenched off trees. Having secured a stick the female returns directly to the nesting site to fix it in position. The male usually accompanies her back even if he has not yet secured or found a stick of his own, though he usually manages to find one. The female first arranges her stick, and later the one passed on to her by the male if he has brought one. The male does not do any actual building himself but waits till she has fixed both the sticks and then they fly off together in search of more. The arranging of a stick generally does not take more than a few seconds. However, when a difficult spot is reached it may take a couple of minutes for the female to adjust a projecting stick to her satisfaction. As many as thirty sticks may be brought and arranged in an hour during the peak of building activity.

In the earlier stages of construction the sticks are arranged in the fork in criss-cross fashion resulting in a circular platform 22-27 cm. in diameter. When this platform is three to four sticks thick, additional sticks are laid on it tangentially, converting it into a shallow cup 7-10 cm. high and 5-8 cm. thick. The sticks, however, are not the only material used in the construction of this outer cup. Instances are on record when soda-water bottle wires, brandy bottle wires (Hume, 1889 : 9, Baker, 1932 : 16, Dewar, 1929 : 27-28), and gold and silver spectacle frames (Dewar, 1905 : 26) have been used in the construction of this outer structure.

The inside of this cup is lined with finer material like khus and other grass roots, coconut and other vegetable fibres, grasses, human and horse hair. Hume (1889 : 9) mentions finding wool and rags in addition to the above materials. Dewar (1929 : 27-28) writes of having come across pine needles, hard twigs and feathers, while Baker (1932 : 16) mentions a nest with the lining comprised of an old cap.

Coming back to the mode of construction, the actual construction of the outer cup and the inner lining is done by the female alone, the male only helping by bringing in suitable material. For the purpose of

lining, wet or green vegetable material is sought probably for their flexibility ; dry material is also collected and wetted before use. The female sits inside the nest and spends hours at a stretch fixing up the lining, and during this time the male brings in the required material. When supplies from the male are inadequate, both the partners make trips together.

Both the male and the female keep busy throughout the better part of the day bringing in material. There are interludes, of course, for meals, a little bit of love-making or a rest for a few minutes, in between the material-hunting trips. From observations made of 14 separate nesting pairs it appears that it usually takes an average pair about four to seven days for completion of a nest with lining and all.

The time factor appears to be directly proportional to the availability of the building material in the locality.

The finished nest is, generally speaking, a large (25-30 cm. diameter) shallow cup of sticks and twigs, roughly put together and occasionally containing metal strips and wires ; the inner cavity is 12-15 cm. across and 7-10 cm. in depth, lined with roots, grass, vegetable fibres, animal hair, and other soft materials already mentioned.

Territory. The house crow does not seem to mind other members of the species building their nests in the same tree or as a matter of fact on the same branch. As many as nine nests are sometimes located in one large tree. To all appearances there are no territorial limitations and all birds, except birds of prey and the koel, are welcome to make use of the nesting tree in any way they think fit.

Laying and clutch size. The eggs are laid only when the nest is complete ; sometimes a couple of days may lapse between the completion of the nest and the laying of the first egg. The female starts sitting in the nest from the time the first egg is laid. Four or five eggs are normally laid at intervals of twenty-four to forty-eight hours each ; occasionally three (Dewar, 1929 : 27-28), and rarely six (Hume, 1889 : 9, Dewar, 1929 : 27-28) eggs, may be laid.

As much variation in the clutch size of this bird has been recorded by various workers in the past it will not, perhaps, be entirely irrelevant to mention here that the clutch size in indeterminate layers like this bird is conditioned by a number of ecological and physiological factors, details of which can be found in Lack's (1947) paper on the significance of clutch size.

The eggs vary a good deal in shape, size, colour, and markings. Typically the eggs are broad ovals pointed towards the small end, but pyriform, elongate, and globular varieties are commonly met with. The eggs are hard and fine in texture and fairly glossy. The ground colour is any shade of bluish green. All eggs are blotched, speckled

and streaked with dull reddish brown, sepia, grey, and neutral tints. The shade and intensity of blotches, specks, and streaks vary a great deal in the various eggs and also in various parts of the same egg, usually near the ends. The size varies from 24-29 mm. \times 33-40 mm.

Incubation. The incubation for the most part is done by the female. The male relieves her at intervals during the day when she goes out for food and a much needed outing. At night the female alone sits in the nest.

It will be interesting to remark here the reaction of the incubating birds to strange eggs and foreign objects appearing all of a sudden in the nest. Usually the nest is never left unattended. One of the birds mounts guard when the other is away and does not ordinarily leave the nest till the partner relieves him or her. But the sight of a koel in the neighbourhood or of a man climbing the tree on which the nest is located or another tree in the vicinity is too much for the crow to endure. Losing all self control it launches in sudden fury an attack all by itself or joins the *mêlée* of the brotherhood for an attack on the intruder, forgetting for a while its own eggs. It is probably in such unguarded moments of extreme excitement that it is deceived by a female koel or an experimenting ornithologist who seizes the opportunity of placing its eggs in the nest or replacing the crow's eggs by some other object (s).

Intelligent as the bird is, it is hard to believe that it does not notice the change when it returns. But it may react differently to the visit of the two intruders. After having noticed the man's approach and then the change in the contents of the nest, it may attribute the change to the visit of the man and may abandon the nest, with its contents. But such desertions are very rare ; in my experience they are not more than 5 per cent, presumably because the crow is not much afraid of man.

If the nest has been robbed completely it is sure to be deserted. If only a part of the contents has been removed or replaced, apparently no great notice is taken no matter how strikingly different the replacement may be. On several occasions I have removed one or two of its eggs and replaced them after painting them scarlet and brown with transparent photographic water dyes, and they have been accepted coolly. Thrice a crow accepted eggs of a jungle crow, twice of a common Myna and once a Paddy bird's added by ones and twos to its own clutch. It refused to incubate a full clutch replaced by Myna's eggs and another one by those of a Drongo, but readily accepted a jungle crow's clutch in replacement. It appears that this species accepts strange eggs and foreign objects if they resemble its own clutch or if one or more of its own eggs are left in the nest along with the replacements.

Period of incubation. By the period of incubation I here mean the time lag between laying of the last egg and the appearance of the last hatchling. Of the 20 nests watched at Vellore for the determination of the period of incubation, in fifteen the eggs hatched out after sixteen days of incubation, in two it took 17 days, in two the eggs did not hatch at all, while one was deserted on the 7th day.

It will be interesting to note here that, in the cases where the eggs did not hatch, the birds incubated for 27 days in one and 30 days in the other before giving up and finally deserting the nest.

At Poona on two occasions I collected crow's nests with eggs, for ectoparasite study, which according to my previous observations should have been incubated for more than a week. To my surprise they failed to show any signs of developing embryo on being opened; evidently the clutches were infertile.

All the eggs in a clutch, do not hatch, especially in clutches of five. Clutches of four and three hatch a comparatively larger percentage than those of five. At Vellore it was observed that of twenty-five eggs from five clutches of five eggs each, twenty (80%) hatched, of thirty-two eggs from eight clutches of four eggs each twenty-eight (87.5%) hatched, while all the 12 eggs (100%) from four clutches of three eggs each hatched out.

The young in the nest. The young hatch out one after the other, at intervals of twenty-four to forty-eight hours. The newly hatched young, like other nidicolous young, are entirely devoid of nestling down. They are unable to stand up and lie helplessly on their delicate and almost transparent abdomens. The body is light flesh coloured. The eyes are closed. The beak and claws are soft and fleshy, and are of the same colour as the rest of the body. The Neossoptiles make their first appearance between forty-eight and seventy-two hours after hatching. They consist of prepennae which are duly replaced by regular contour feathers. The remiges and rectrices appear in the second week and look like gramophone needles at first. Then a tuft of hair-like feathers (barbs) appears at the needle point. At this stage, with elongated shafts and tufts of hair at the distal end, they resemble miniature artists' brushes arranged in rows of uneven sizes. The tuft gradually elongates into rachis and vane while the shaft ultimately forms the calamus. By the end of the fourth week the young are fully fledged. The colour of the plumage of the fully fledged young is similar to that of adult bird.

Apparently the freshly hatched nestlings are not fed, or rather are not able to accept food, till about 24 hours after their emergence from the shell. Some time between forty-eight and seventy-two hours their eyes open and by that time the feeding of the young by the parents is in full swing. Both parents bring food and feed the young. One of the

parents is always around during the early days to guard them from predators, to warn them, or to protect them from the hot sun or a light shower of rain, while the other is hunting food for them.

Just as all the eggs that are laid do not hatch, all the young ones that hatch out do not live to leave the nest as will be seen from Table I.

Table I

MORTALITY IN FLEDGLINGS OF THE HOUSE CROW *Corvus splendens*

Nest No.	No of eggs laid	No. of fledglings hatched out	No. of fledglings flew out of nest	No. of fledglings died
1	4	4	3	1
2	5	5	3	2
3	4	4	4	0
4	3	3	3	0
5	5	4	2	2
6	4	4	3	1
7	4	3	3	0
8	3	3	2	1 (1 Koel present)
9	5	3	3	0
10	4	Nest deserted		
11	4	3	2	1
12	3	3	3	0
13	5	4	3	1
14	4	Nest deserted		
15	4	4	2	2
16	4	3	3	0
17	5	4	3	1
18	4	Nest deserted		
19	3	3	1	2 (1 Koel present)
20	4	3	1	2 (1 Koel present)

The majority of deaths occur in the first week. Most deaths amongst the young ones of the crow are due to want of food. It is rarely due to a chance fall from the nest or as a result of some marauder's attack. Although the birds keep bringing in food from dawn till

dusk they cannot usually meet the full demand of a clutch of five, and sometimes even of four, nestlings who, for the first few days, are supposed to consume more than their own weight of food; unless, of course, there is abundance of food in the locality, in which case they do get around to the feeding of all the five or four of the clutch satisfactorily. When the fledglings are very young, the parents seem to make no discrimination whatever, in feeding them. The parent on arrival at the nest with bill full of food is confronted with a number of gaping mouths as each of the nestlings raises its neck and gapes widely. The parent stuffs the food into one of the gaping mouths, probably that which happens to be the nearest, until the food it has brought is finished, or the chick is unable to swallow any more; in such cases what remains is pushed down another throat. This is repeated at every visit by the parent. The young which are not fed until their stronger brethren have received all they can take start losing ground with the passage of time, and soon become so weak that they cannot even raise their necks to demand food. The parents do not seem to take any notice of such weaklings, and certainly do not make any special attempts to feed them. The weakest thus go to the wall. The dead are thrown out by the parents without the slightest concern. Most such deaths occur during the first week and very rarely during the second week.

The nestlings who survive the critical early phase in the nest remain there for three to four weeks, closely guarded and devotedly fed by the affectionate parents. A three-to-four-week-old nestling is fully fledged and can fly short distances if forced to do so. After leaving the nest they stay around in the branches of the nesting tree where they are fed by the parents. Later they stay close to the parents for a few weeks, usually the mother, and follow her wherever she goes. As soon as she picks up a little bit of food the demand by the young one starts. It opens and shuffles its wing and presents a gaping bill to be fed. Generally the mother transfers the morsel to it.

Nesting success. By nesting success I mean here the ratio of the fledglings that flew from the nest to the number of eggs laid. As already indicated the nesting success in crows depends on many factors, the most important ones being the amount of food available for the young at the nesting stage, the fertility of the eggs laid, and interference by parasites (koels) and predators (including man). In the present study a total of eighty-one eggs were laid in twenty nests. A total of forty-four young excluding the three koel fledglings left the nest. It roughly works out to fifty-four per cent.

Parasitising by the Koel [*Eudynamys scolopacea* (Linnaeus)]. Coming back again to the subject of deceiving the clever crow, none can beat the

Koel *Eudynamys scolopacea* (Linnaeus). This species of parasitic cuckoo, whose breeding season happens to coincide with that of the crow, has decided to entrust, rather thrust, the responsibility of a part of her own domestic duties to this crow, and has made the crow its main host.

The crow, not liking to be exploited, guards its nest all the twenty-four hours, but the mere sight of a koel prompts it to leave its nest and chase the koel. Knowing this weakness of their victim the male and female koels seem to have worked out a clever bit of a strategy. When the female koel is ready to lay, the male flies up to the crow's nest and makes himself known by emitting loud notes. The very sight of him infuriates the crow, who is usually incubating alone. Leaving the nest unguarded the crow attacks the koel, who turns tail the moment the owner or owners of the nest go for him. Being a better flier the male koel manages to keep only a little ahead, thus encouraging the crows to chase further and leads them away from the nest. The female koel who sits hidden, watching the proceedings, then takes possession of the deserted nest and relieves herself of her egg. She then flies away emitting a shrill *kuil-kuil-kuil*, apparently to tell the male that the strategy has been successful. The male then shakes off the pursuers and proceeds at full speed to join the female. Sometimes, however, things go wrong and the male or the female koel is caught red-handed and punished for its crimes by the indignant crows. I have myself seen and there are instances on record (Butler, 1876, quoted by Hume, 1889) when koels have been mauled by an angry mob of crows.

Usually only one egg is laid by the koel in one nest. Sometimes, however, more than one koel's egg may be found in crow's nest (Jacob, 1915 ; Jones, 1916 ; Abdulali, 1932¹ ; Burton, 1935); probably, they are the produce of more than one bird. It is difficult to say whether or not the koel destroys one of the crow's eggs, when she lays one of her own in its nest. To all appearances she does not (Dewar, 1907). A koel leaving a crow's nest with an egg in its beak is yet to be seen.

Meanwhile the crows, pleased with themselves for having successfully driven away the treacherous koel, return to their nest only to be confronted with a strange egg lying amongst their own. Whether they recognise it or not is a controversial question, but the fact remains that the crows neither desert the nest nor try to throw out the koel's egg.

The koel's egg has a superficial resemblance to that of a crow but it is smaller and has a green ground colour instead of blue. The green may be olive, sea-green, or almost stony colour. The texture is compact and fine and is entirely devoid of gloss. It is speckled, spotted,

[¹ The nest contained 11 koel eggs and none of the crow.—Eds.]

streaked and clouded with brown, or red or purple tint. The average size is 30 mm. in length and 23 mm. in breadth.

The koel's egg (or eggs) is (are) hatched along with (its) their own by the crows in the most matter of fact way. The period of incubation for koel's eggs as observed during the present study in three cases was 13 days. The young koel usually hatches a little before its foster brethren and hence has a little start on them. The freshly hatched koel like the young one of all other nidicolous species is blind, pinkish red in colour, entirely devoid of down or feathers, with a very soft and fleshy beak and claws. But for its zygodactyl claws it could easily pass for a crow fledgling. The crows do not appear to see this difference, and feed it in right earnest, even before any one of their own eggs is hatched. The young koel seems to have an insatiable hunger and greedily devours large quantities of food brought by the foster parents. By the time the young crows hatch out, it is usually big and strong enough to attract the greater attention of its foster parents by stretching out its neck towards them as they come in with food, and thus obtains a greater share of it. The great hunger of the koel nestling tells on some of the young crows, who fight a losing battle in the struggle for existence in the nest and perish. All but one, sometimes two of the young crows die for want of food if their nests include a koel nestling. Twice I have collected crow's nests at Poona, with only two koel fledglings, about three weeks old and no crows. As the brood size is limited by the feeding capacity of the parents (Lack, 1947) I am inclined to believe that the young crows in those nests could not compete with the two koels.

The young koel is usually the healthiest occupant of the nest. It acquires its feathers faster than its foster brethren. The plumage is uniformly black spotted with white all over the body, wings, and tail. It is still in this plumage when it leaves nest and when it finally takes leave of its foster parents. It leaves the nest along with and about the same time as the young crows, provided there are any left. The crows continue to feed it even after it has left the nest. On many occasions I have seen crows paying more attention to this foster child, whose demand for food never ceases, than to their own. The procedure for asking for food is the same as that of young crows. Although not well adapted for terrestrial movement, after leaving the nest it often alights on a stone or boulder to demand food when the foster parents are feeding on ground.

REFERENCES

- Abdulali, H. (1932) : Eleven Koel eggs in a crow's nest. *J. Bombay nat. Hist. Soc.* 35 : 458.
- Acharya, H. G. (1951) : Mating of House Crow, *Corvus splendens splendens* Vieillot. *ibid.* 50 : 170.
- Adam, R. M. (1873) : Notes on the Birds of Sambhar Lake and its vicinity. *Stray Feathers* 1 : 361-404.
- Ali, S. A. (1926) : The mating of crows. *J. Bombay nat. Hist. Soc.* 31 : 823.
- — — (1946) : The Book of Indian Birds. Bombay Natural History Society, Bombay.
- — — (1953) : Birds of Travancore and Cochin. Oxford University Press.
- — —, & Abdulali, H. (1937) : Birds of Bombay and Salsette. *J. Bombay nat. Hist. Soc.* 39 : 91-103.
- Baker, E. C. S. (1922) : The Fauna of British India including Ceylon and Burma. Birds 1. Taylor and Francis, London.
- — — (1932) : Nidification of the Birds of the Indian Empire 1. Taylor and Francis, London.
- Barnes, H. E. (1886) : Notes on the birds nesting in Rajpootana. *J. Bombay nat. Hist. Soc.* 1 : 38-62.
- Burton, R. W. (1935) : Cuckoo Lore. *ibid.* 38 : 266-281.
- Butler, Capt. E. A. (1875) : Notes on the Avifauna of Mount Aboo and Northern Guzerat. *Stray Feathers* 3 : 437-500.
- Cripps, J. R. (1878) : First List of Birds of Fureedpur, Eastern Bengal. *ibid.* 7 : 238-315.
- Davidson, C. S., and Wenden, C. E. (1878) : A contribution to the Avifauna of Deccan. *ibid.* 7 : 68-95.
- Davidson, J. (1887) : Rough List of the Birds of Western Khandesh. *ibid.* 10 : 279-327.
- Dewar, D. (1905) : The Indian Crow. Thacker Spink and Co., Calcutta.
- — — (1907) : An enquiry into the parasitic habits of the Indian Koel. *J. Bombay nat. Hist. Soc.* 17 : 765-82.
- — — (1929) : Indian Birds' Nests. Thacker Spink and Co., Calcutta, Bombay.
- Doig, S. B. (1879) : Birds Nesting on the Eastern Nara. *Stray Feathers* 8 : 369-379.
- Ferguson, H. S. (1903) : The Birds of Travancore with Notes on their nidification by T. F. Bourdillon. Part 1. *J. Bombay nat. Hist. Soc.* 15 (2) : 249-264.
- Gill, E. H. N. (1922) : A description of Nests and Eggs of the Common Birds occurring in the plains of United Provinces. *J. Bombay nat. Hist. Soc.* 28 : 1069-74.
- Hume, A.O. (1873) : Nests and Eggs of Indian Birds. Rough Draft. Superintendent of Government printing, Calcutta.
- — — (1889) : Nests and Eggs of the Indian Birds. Vol. I. 2nd Edition. R. H. Porter, London.
- Inglis, C.M. (1931-34) : The Crow family of our area. *J. Darjeeling nat. Hist. Soc.* 6-8 : 48-54.
- Jacob, J. R. (1915) : Seven Koels' eggs in one nest. *J. Bombay nat. Hist. Soc.* 24 : 191.
- Jesse, W. (1902) : On the birds of Lucknow. *Ibis* (8) 2 : 470-490.
- Jones, A. E. (1916) : Number of Koels' (*E. honorata*) eggs found in one nest. *J. Bombay nat. Hist. Soc.* 24 : 370.
- Lack, D. (1947) : The significance of clutch size. *Ibis* 89 : 302-52.
- Munn, P. W. (1894) : On the Birds of Calcutta District. *Ibis* (6) 6 : 39-77.
- Oates, E. W. (1889) : The Fauna of British India including Ceylon and Burma, Birds 1. Taylor and Francis, London.
- Prater, S.H. (1926) : Crows' nests and electric cables. *J. Bombay nat. Hist. Soc.* 30 : 913.
- Pycraft, W. P. (*s.a.*) : The infancy of animals. Hutchinson & Co., London.
- — — (1911) : Feather. Encyclopaedia Britannica. 11th Ed. 10 : 343-346.
- Rao, N. B. (1936) : Mating habits of crows. *J. Bombay nat. Hist. Soc.* 38 : 620.
- Reid, G. (1881) : The Birds of Lucknow Civil Division. *Stray Feathers* 10 : 1-88.
- Sen, S. N. (1947) : Late breeding of Common House Crow. *J. Bombay nat. Hist. Soc.* 44 : 474.
- Scully, J. (1879) : A contribution to the ornithology of Nepal. *Stray Feathers* 8 : 204-366.
- Swinhoe, C., & Barnes, H. (1885) : On the birds of Central India. *Ibis* (5) 3 : 124-138.
- Taylor, C.J.W. (1887) : A tentative list of the Birds of Manzeerabad, Mysore. *Stray Feathers* 10 : 454-467.
- Van Tyne, J., & Berger, A. J. (1959) : Fundamentals of Ornithology. John Wiley & Sons, Inc., London.
- Vidal, G. W. (1880) : First list of Birds of South Konkan. *Stray Feathers* 9 : 1-96.
- Whistler, H. (1928) : Popular Handbook of Indian Birds. Gurney and Jackson, London.